(19) World Intellectual Property Organization

International Bureau





(43) International Publication Date 21 July 2005 (21.07.2005)

PCT

(10) International Publication Number WO 2005/067081 A1

(51) International Patent Classification⁷: 4/62, 4/04, 4/66, 4/58, 10/40, 6/16

H01M 4/02,

YAMAKAWA, Msahiro [JP/JP]; c/o Zeon Corporation, 6-1, Marunouchi, 2-chome, Chiyoda-ku, Tokyo 100-8323 (JP).

(21) International Application Number:

PCT/JP2004/019835

(22) International Filing Date:

28 December 2004 (28.12.2004)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

2004-254 5 January 2004 (05.01.2004) ΙP 60/534,989 9 January 2004 (09.01.2004) US

- (71) Applicants (for all designated States except US): SHOWA DENKO K.K. [JP/JP]; 13-9, Shiba Daimon 1-chome, Minato-ku, Tokyo 105-8518 (JP). ZEON CORPORATION [JP/JP]; 6-1, Marunouchi 2-chome, Chiyoda-ku, Tokyo 100-8323 (JP).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): SOTOWA, Chiaki [JP/JP]; c/o Corporate R & D Center, Showa Denko K.K., 5-1, Okawacho, Kawasaki-ku, Kawasaki-shi, Kanagawa 210-0858 (JP). TAKEUCHI, Masataka [JP/JP]; c/o Corporate R & D Center Showa Denko K.K., 5-1 Okawacho, Kawasaki-Ku, Kawasaki-Shi, Kanagawa 210-0858 (JP). MORI, Hidekazu [JP/JP]; c/o Zeon Corporation, 6-1, Marunouchi 2-chome, Chiyoda-ku, Tokyo 100-8323 (JP).

(74) Agent: OHIE, Kunihisa; Ohie Patent Office, Selva-Ningyosho 6F, 14-6, Nihonbashi-Ningyocho, 2-chome, Chuo-Ku, Tokyo 103-0013 (JP).

- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: NEGATIVE ELECTRODE MATERIAL FOR LITHIUM BATTERY, AND LITHIUM BATTERY

(57) Abstract: The present invention relates to a negative electrode material for a lithium battery characterized by comprising a carbonaceous negative electrode active substance having a specific surface area of 1 m²/g or more, a binder formed of styrenebutadiene rubber and a carbon fiber having a fiber diameter of 1 to 1,000 nm; and to a lithium battery using the negative electrode material, which has excellent characteristics, i.e., low electrode resistance, high electrode strength, excellent electrolytic solution permeability, high energy density, and good high-speed charging/discharging performance. The negative electrode material contains carbon fiber in the amount of 0.05 to 20 mass% and the binder formed of styrene-butadiene rubber in 0.1 to 6.0 mass%, and may further contain a thickner such as carboxymethyl cellulose in the amount of 0.3 to 3 mass%.

